

**Notice of Allowability**

Application No.

09/624,385

Applicant(s)

KATAYAMA ET AL.

Examiner

Jin-Cheng Wang

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4/4/2006 & 2/15/2006.
2. ☒ The allowed claim(s) is/are 1,5,8 and 11.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

***Reasons for Allowance***

1. The following is an examiner's statement of reasons for allowance of claims 1 and 5 in the amendment of 2/15/2006: Nothing in the prior art anticipates or suggests, "a setting step, of automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region" in an image synthesis method comprising an input step of inputting a plurality of image data representing a plurality of images; a placement information generating step of generating placement information about horizontal and vertical placement direction of the plurality of images, determined by the horizontal and vertical placement direction of the plurality of images represented by the image data inputted in the input step; a placement information obtaining step of obtaining the placement information about a plurality of images in which adjacent images have a common subject region; a setting step of automatically selecting and setting one mapping mode output of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region, each mapping mode corresponding to a different mapping surface, without a user intervening to determine the mapping mode or the corresponding mapping surface; a synthesis step of combining the plurality of images by using the mapping mode set in the setting step; a changing step, of changing the mapping mode; and a generating step, of issuing when an image formed by changing the mapping mode in the changing step does not comply with a predetermined condition set in accordance with the mapping mode, a warning and generating and displaying a synthesized image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image

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exceeds a predetermined angle of view while simultaneously generating and displaying the synthesized image within the predetermined range of viewing angle.

2. The following is an examiner's statement of reasons for allowance of claim 8 in the amendment of 2/15/2006: Nothing in the prior art anticipates or suggests, "setting means for automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region" in an image synthesis apparatus comprising: inputting means for inputting a plurality of image data representing a plurality of images; placement information generation means for generating placement information about horizontal and vertical placement direction of the plurality of images, determined by the horizontal and vertical placement direction of the plurality of images represented by the image data inputted by the inputting means; placement information obtaining means for obtaining the placement information about a plurality of images in which adjacent images have a common subject region; setting means for automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region, each mapping mode corresponding to a different mapping surface, without a user intervening to determine the mapping mode or the corresponding mapping surface; synthesis means for combining the plurality of images by using the mapping mode set by the setting means; changing means for changing the mapping mode; generating means for issuing, when an image formed by changing the mapping mode by the changing means does not comply with a predetermined condition set in accordance with the mapping mode, a warning and generating and displaying a synthesized

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image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view while simultaneously generating and displaying the synthesized image within the predetermined range of viewing angle; and display means for displaying a cuttable rectangular region without a margin in the synthesized image.

3. The following is an examiner's statement of reasons for allowance of claim 11 in the amendment of 2/15/2006: Nothing in the prior art anticipates or suggests, "a setting step of automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region" in a computer-generated storage medium having recorded thereon a program for implementing a computer-implementable image synthesis method for combining a plurality of images, the program comprising: an input step, of inputting a plurality of image data representing a plurality of images; a placement information generating step of generating placement information about horizontal and vertical placement direction of the plurality of images, determined by the horizontal and vertical placement direction of the plurality of images represented by the image data inputted in the input step; a placement information obtaining step of obtaining the placement information about a plurality of images in which adjacent images have a common subject region; a setting step of automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region, each mapping mode corresponding to a different mapping surface, without a user intervening to determine the mapping mode or the corresponding mapping

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surface; a synthesis step of combining the plurality of images by using the mapping mode set in the setting step; a changing step of changing the mapping mode; and a generating step of issuing when an image formed by changing the mapping mode in the changing step does not comply with the a predetermined condition set in accordance with the mapping mode, a warning and generating and displaying a synthesized image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view while simultaneously generating and displaying the synthesized image within the predetermined range of viewing angle.

The cited reference, Teo U.S. Patent No. 6,246,413, does not teach automatically selecting and setting the mapping mode. Xiong et al. U.S. Patent No. 6,434,265 teaches in figures 2 and 3 a user interface and a global optimization that *automatically* provides feedback to the computer system when the pair-wise objective function is not desirable for a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong further teaches an alternative human interaction being present throughout the image synthesis process to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene when necessary. Xiong discloses that a panorama is constructed on a particular geometry that will best facilitate the rendering of the projection onto a chosen viewing plane (a geometric surface) such as cubic, polyhedral, cylindrical and spherical geometries. Xiong describes that a user can alternatively intervene to select a viewing plane. Xiong discloses that upon the user's intervening

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of selecting a viewing plane, the computer program automatically selecting and setting the mapping mode in accordance to the parameters set by the user's intervening action. Teo teaches that the viewing software can *automatically* invert the projection by automatically straightening out the portion of the panoramic image being displayed (column 7-8). Teo teaches in column 10 the mapping mode of mapping onto the planar surfaces such as mapping the panorama images onto a cube and the mapping mode of mapping the panorama images onto polyhedral surfaces to form cylindrical panorama images. Once the geometry is selected either by a user or **by the viewer software**, the image processor automatically transforms the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto the surface geometry. Therefore, the mapping mode is automatically selected and set by the viewer software because the steps involved a mode in the mapping or a mode in transforming the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto the changed/selected geometric surface are automatically performed by the software. Although Teo teaches that a user can change a mapping surface (column 11, lines 1-9) by adjusting the shape of the mapping surfaces so that a given cylindrical panoramic image can be transformed to produce a modified panoramic image, the procedure can be automated by the computer software. Teo therefore teaches *automatically* selecting and setting a mapping mode or changing the plane for mapping the panoramic image by the computer through a user interface or **by the computer software without the user interface**. Teo further discloses the horizontal placement of image by projecting a scene onto a cube so that horizontal lines of the scene appear horizontal in the panoramic image, and vertical placement of image by projecting the panoramic image on the *vertical cylinder* or by rotating the polyhedral surface relative to a cylindrical

panoramic image and making adjustments to the sides and edges of the polyhedral surface so that the placement of images appear vertically on the mapping surface and thus selecting and setting a mapping mode with the mapping surface being adjusted without a user intervention. Teo teaches the user interface enabling the user to rotate the polyhedral surface relative to a cylindrical panoramic image and making adjustments to the sides and edges of the polyhedral surface so that the placement of images appear vertically on the mapping surface. However, neither Teo or Xiong discloses the claim limitation of “a setting step of automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region” set forth in the independent claim 1, 8 and 11.

Shum et al. U.S. Patent No. 6,271,855 teaches a plurality of mapping modes such as zooming and panning the screen images of the interior scene shown in the panoramic view of Fig. 10A wherein the mapping surfaces within panoramas are different and changing the type of panoramas such as the spherical panoramas and the planar panoramas. Shum teaches a setting step of zooming/panning the panorama and setting the spherical panoramas by the interactive user interface so that the mapping mode changes in which each resulting panorama has different mapping surfaces. Shum further teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined panoramic view of a 3D scene or the predetermined camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model in response to the change in the geometric

constraints determined by the projection plane or in response to the change in the panoramic view. The geometric constraints change due to the change in the projection plane from a planar panorama to a spherical panorama wherein the planes within the spherical panorama are changed to spherical planes and the panorama view can be changed as well by zooming/panning panorama and/or selecting a portion of the panorama. Therefore, un-solvability of the linear equations occurs *in the process of changing the mapping mode* because the change in the mapping mode or the change in the geometric surface also changes the geometric constraints governing the linear equations. When the linear systems of equations are not solvable, a user can switch the mapping plane orientation or changing the mode of projection surface to meet the constraint equations requirements wherein the plane normals have changed. Moreover, the projection space can be in the form of any shape such as spherical or planar and by changing the camera's point of view and/or the panorama view and the coordinates and directions of the plane normals, the projection space is effectively changed and accordingly the mapping mode is changed.

However, Shum teaches changing the mapping mode by zooming and panning the screen images of the interior scene shown in the *initial* panoramic view of Fig. 10A (See Figs. 11A and 11B and column 23-24) and changing the type of panoramas such as the spherical panoramas (Figs. 15A-15B) and the planar panoramas (Figs. 16A-16B). Shum teaches a setting step of zooming/panning the panorama and setting the spherical panoramas (column 23-24) by the interactive user interface so that the mapping mode changes wherein each resulting panorama has different mapping surfaces in accordance with the user input commands (column 23-24) wherein the panorama mapping surfaces change as a result of the zooming and panning.



However, Shum does not disclose the claim limitation of “a setting step of automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region” set forth in the independent claim 1, 8 and 11.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

### ***Conclusion***

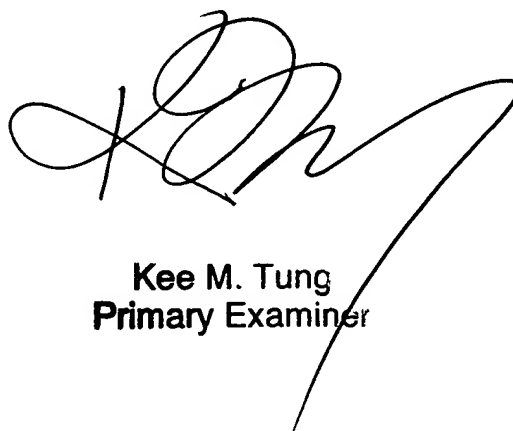
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jcw



**Kee M. Tung**  
**Primary Examiner**